



DISCUSSION

The geologic structure and history of various parts of the continental shelf southeast and southwest of Kodiak Island have been described in several reports (von Huene, 1972; Fisher, 1979; Nilsson and Moore, 1979; Fisher and von Huene, 1980; Moore and Albrecht, 1980); we give only a brief summary here. This map is a compilation of the published structure maps and includes some new seismic-reflection data. Only 24-fold seismic-reflection data were used. Holmes and others (1978) showed detailed analyses of refraction velocities from soundings deployed over the shelf (table 1).

The horizon contoured here is an unconformity. The age of rocks under the unconformity varies geographically because the continental shelf near Kodiak Island is divided tectonically by the Border Range Fault (MacFadden and MacFadden, 1974; Fisher, 1981). On the northwest side of this fault is a narrow, north-south-trending belt of Jurassic schist and diorite separates the fault from a thick section of sedimentary rocks on the Alaska Peninsula and under Shelikof Strait, that are as old as middle Paleocene, but are mainly of Mesozoic age. Northwest of this fault, Tertiary rocks are thin, and rocks under the contoured unconformity are mainly Mesozoic in age. Southeast of the Border Range fault, the oldest known rocks are in a Cretaceous mélange -- the Uyak Complex -- that is adjacent to the fault. The deformed Upper Cretaceous turbidites of the Kodiak Formation are faulted against the southeast side of the mélange. Southeast of the Kodiak Formation lie deformed Tertiary turbidites of the Ghost Rocks, Sitkalidak, and Sitkalak Formations. Southwest of Kodiak Island, then, rocks under the contoured unconformity are as old as Cretaceous; and southeast of the island, rocks under the unconformity are thought to be of Paleocene age (Fisher and Holmes, 1980), and they could be as old as Late Cretaceous.

Microfossils collected from rocks above the unconformity near Albatross Bank show that these rocks are mostly late Miocene or Pliocene and younger in age, although microfossils also indicate that some rocks are as old as middle Miocene (McClintock and others, 1980a, b). Rocks above the unconformity on the northwest in the area of Shelikof Strait, these rocks are probably no older than Pliocene or Pleistocene.

The continental margin near Kodiak Island is structurally segmented by tectonic boundaries -- one boundary strikes northwest along the southeast coast of Kodiak Island; the other strikes southeast from Kodiak Island and the Barren Islands (von Huene and others, 1979; Fisher and others, 1981). The boundaries are marked by offset volcanoes, truncated structural trends, and separated some of after-appearing earthquakes.

Before the late Miocene or Pliocene, the shelf southeast of Kodiak Island and near Tugidak basin was exposed and eroded. Then the shelf subsided differentially, separating Albatross and Stevenson basins by an area underlain by pre-tectonic rocks at shallow depths. Later, perhaps during the Pliocene, the shelf was deformed, creating major elevated shelf structures such as the Tugidak uplift, Albatross Bank, Portlock anticline, and the Stevenson rise. During the late Miocene or Pliocene, this area appears to have been exposed; the transgressing ocean apparently reached the strait during the Pliocene or Pleistocene.

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